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ABSTRACT

This primer was developed to help secondary school industrial arts teachers to encourage and promote reading in their curricular programs. Guidelines and suggestions are offered on ways teachers can stimulate student reading by capitalizing on student interests and on ways teachers can reinforce vocabulary and comprehension skills. The manual s first section introduces the idea of teaching reading skills in industrial arts classes. Other sections include: (1) skills needed in content area; (2) evaluating the reading abilities, interest, and attitudes of students; (3) selecting appropriate instructional materials; (4) vocabulary improvement techniques; (5) reading comprehension improvement techniques; (6) techniques to stimulate reading; and (7) a bibliography of books and articles related to reading. (CJ)

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PREFACE

This primer was initially developed as a class project in RDG 467, Spring 1978. Since then individual students have contributed lessons to provide the Industrial Arts Teacher with a "primer" to reading. It is just a "beginning", meant to stimulate ideas; it is up to you, the reader or student, to go beyond. The primer compliments the Fall 1979 RDG 467/480 Syllabus which provides instruction in how to develop the sample lessons and teaching methods described.

This primer reflects how reading can be integrated in Industrial Arts to improve students' vocabulary, comprehension and study skills as they are needed to succeed in the various Industrial Arts curriculum areas. Industrial Arts consists of a large technical vocabulary to be mastered, reading material that is varied, difficult, and of a technical nature, and directions that can be confusing and lengthy. The Industrial Arts teacher is in a very unique place to stimulate a wide reading habit by encouraging students to read trade books, "how-to" books, magazines, and craft books. Industrial Arts is also a unique place to develop critical reading and thinking as students decide on the appropriate equipment, safety rules, purchasing of necessary materials, and the best solution to a problem or complicated project.

I know the idea of reading/thinking skills in an Industrial Arts class is new to many. Just have an open mind when you read the handbook, try out and experiment with these and similar activities. Experience for yourself their effectiveness and value.

ACKNOWLEDGEMENTS

This primer is a reality because of the creativity of the students and teachers whose names appear on the title page and on pages within the handbook. I would like to give special thanks to Mrs. Dorolis Wade, secretary to the secondary reading staff, for her excellent typing and proofreading.

Berta Parrish
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HELPING YOUR STUDENTS COPE WITH THE LANGUAGE OF INDUSTRIAL ARTS

Students in woodshop, mechanical drawing, automotives, electronics, metals, welding, graphic arts, general shop, crafts, etc. should posess special language-coping skills in order to participate more profitably in the above Industrial Arts courses.

They should be able to read in order

1. To comprehend the special technical vocabulary, including symbols and abbreviations, both written and spoken in all industrial arts courses.
2. To locate information, using the tools of research.
3. To follow directions in performing all operations.
4. To follow all safety instructions.
5. To identify main ideas and technical concepts, and use them accordingly.
6. To retain facts -- specifications, coding, formulas...
7. To get data from diagrams, graphs and charts.
8. To analyze and solve technical problems, and apply these solutions to their work.
9. To use the organization and information of the textbook and manuals advantageously.
10. To compare and contrast, for example, materials and techniques of a technical nature.
11. To understand an explanation of a process and its application to industry.
12. To relate pictorial representations to actual situations.
13. To keep up on current happenings, recent findings, and advancements through professional articles and publications.
14. To adopt a rate appropriate to the difficulty of the material, purpose for reading the material, and experience with the content of the material

Evaluating the reading abilities, interests and attitudes of the students.

STUDENT INTEREST INVENTORY

The Interest Inventory exercise is a type of study to find out what the interests of the students are and to find out what each student likes to read. The interest inventory is directed at how Industrial Arts students will react to a simple questionaire on their background and their interests in the different types of reading materials. The students will respond with a variety of answers to each question and their answers should be quite interesting if the students respond with enthusiasm.

The responses and answers of the students can then be used in strategies to aid motivation of the students so that they perform appropriately to fill their requirements for the course of study. One such motivation activity, for example, in Beginning-Auto or Basic-Auto is to have students see the actual parts taken off of the car, the parts taken apart, each internal part explained, and reassemble the unit so that it will work as before it was taken apart or fixed if it was ruined.

A training and motivation activity of this type will further explain what the students were reading about and to help out with some of their doubts about the content in progress.

The inventory can reveal several types of experiences and interests the students have or don't have yet, and so on. Also the interest invertory should aid to identify some problems the students might have with important reading material. The inventory should also aid to identify some problems the teacher might encounter when he is designing reading programs for his class including laboratory performance sheets for individualized instruction.

ATTITUDES TOWARD READING

The analysis of the students attitudes towrds reading is also a questionaire type of study to find the why's, the how, what, where, and etc. of their attitudes and expectations of their abilities to read Industrial Arts materials.

The reading attitudes analysis should then make it easier for the Industrial Arts teacher to decide on what training to perform, teaching strategies to use, and to fit the students to the type of environment the students will need for reading and for more efficient learning.

Such an environment means an inviting study area, the proper reading and visual aids material, and other items that will fit the students adequately for reading and other classroom studying the students will do. Students have a better chance of learning if the reading matefials are of interest to them in addition the ones that are for his reading needs.

The environment should fit the students by their grade level, their reading level, their background or experiences, their age level, and other characteristics of Industrial Arts students which the teacher needs to study first. This will enable him to do his job with better judgement on the type of material his students will need and can use at their proper level.

By using the students' knowledge, abilities, and qualities, an Industrial Arts teacher has a better chance of getting students to read Industrial Arts materials so that they can learn and also to better on their tests and exams.

INDUSTRIAL ARTS INTEREST INVENTORY

1. Have you taken an Industrial Arts course before? Where?_____ How long?_____
2. What areas have you worked in before? Woods_____ Metals_____Plactics_____
   Electronics_____ Drawing_____Graphics_____Power_____Other_____
3. Check the power equipment you have used. (S - at school; H - at Home).
   hand sander_____table saw_____jointer_____hand drill_____
   wood lathe_____ surfacer_____ router_____drill press_____
   radial arm saw_____ handsaw_____ belt sander _____spray gun_____
4. What is your interest in taking I.A.? as a hobby_____ a career_____
5. List projects you have done either at home or at school.

6. This course requires some reading and some math. Do you have trouble in either area?

7. What magazine about cars, or any area of industrial arts do you read?

8. What hobbies or collections do you have?

9. What subjects do you like best in school?

10. Give some titles of books you have and enjoyed.

Complete the following sentences:

11. Studying Industrial Arts is_____.
12. My favorite Industrial Arts activity is_____.
13. The most difficult thing about reading an Industrial Arts textbook is_____
    _____.
14. The homework I am given is_____.
15. I feel reading is_____.
16. The project I would most like to complete in Industrial Arts is_____.
17. I feel I am _____.
18. My favorite sport is_____.
19. My favorite person is_____.
20. I think school should _____

ATTITUDES TOWARD READING

DIRECTIONS: Read each statement below. Circle the letter that stands for the answer that you agree most with.
(A)= Strongly agree, (B)= Agree, (C)= Undecided, (D)= Disagree, (E)= Strongly disagree.

1. Reading is for learning but not for enjoyment. A B C D E
2. Reading about auto mechanics is more worthwhile. A B C D E
3. Money spent on books is well spent. A B C D E
4. I spend money on auto mechanics related books, A B C D E
5. There is nothing to be gained from reading books. A B C D E
6. Any book is good enough for me. A B C D E
7. Books are a bore. A B C D E
8. Reading about cars is a good way to spend spare time. A B C D E
9. Reading turns me on. A B C D E
10. Reading is only for grade grubbers. A B C D E
11. Reading the text helps with the auto class lectures. A B C D E
12. Books aren't usually good enough to finish. A B C D E
13. I have reading problems. A B C D E
14. Reading about auto mechanics is rewarding to me. A B C D E
15. Reading about auto mechanics becomes boring after about an hour. A B C D E
16. Most books are long and dull. A B C D E
17. Free reading doesn't teach anything. A B C D E
18. There should be more time for free reading during the school day. A B C D E
19. Free reading is more enjoyable. A B C D E
20. There are many books which I hope to read. A B C D E

CLOZE TEST

SUBJECT: Drafting 1&2

GRADE: 9-12

TEXT: Mechanical Drawing French, Svensen, Helsel, Urbanick

Cloze testing has many uses in the classroom, for use in determining how well a textbook might be utilized by the student; through the use of context clues and sentence structure, student's comprehension of what the author is saying, how well the students can grasp the content of a new chapter or unit through reading, and so on.

CONSTRUCTION:

1. Select passage. 250 to 300 words long. The selection should not include material previously read by your students and should include complete paragraphs so that the students will have the benefit of complete thought units within the selection.

2. Identify words to be deleted. Every fifth word should be deleted. Start your deletions in the second sentence of the selection and stop in the next to the last sentence.

3. Prepare a stencil. Type the selection on a stencil with blanks substituted for each of the words to be deleted. All blanks should be of equal length--long enough to allow the students to write in the longest deleted word.

ADMINISTRATION: Stress the following points in your oral directions to the students.

1. Only one word should be written for each blank.
2. Students should try to fill in every blank on the paper, therefore guesses are encouraged.
3. Incorrect spellings are not counted as errors; however each supplied word should be recognizable.
4. A cloze test is not a timed test.

SCORING

1. Count as correct only those words that are exact matches of the deleted words.
2. Synonyms are not counted as correct, only if it is a misspelled word.

3. Inappropriate word endings (s, ed, er, ing) should not be counted as incorrect. This means the student is not aware of the complete meaning of the passage.

To establish the criterion for the three reading levels, independent, instructional, and frustration; follow the steps given below that were used for the atta ched Cloze test.

a. Number of words in passage 250
b. Number of words deleted 43
c. 40% x 43 = 17
d. 60% x 43 = 26

16 and below correct is the frustration level.

17 to 26 correct is at the instructional level.

27 and above are at the independent level.

The ideal reading level for a classroom would be if 2/3 (66%) of the students were at the instructional level.

MECHANICAL DRAWING

Pictorial drawing is an essential part of the graphic language in engineering, architecture, science, electronics, technical illustration, and in every profession. It is used in (all) kinds of technical literature (as) well as in catalogs (and) assembly, service, and operating (manuals). Architects use pictorial drawings (to) show what the finished (building) will look like. (Advertising) agencies use pictorial drawings (to) show the consumer a (new) product.

Pictorial drawings are often (used) to show exploded views (on) production and assembly drawings (to) illustrate parts lists, (to) explain the operation of (machines), apparatus, and equipment, and (for) many other commercial and (technical) purposes. In addition, most (people) use some form of (pictorial) sketches to help in (communicating) ideas that are difficult (to) describe in words.

TYPES (OF) PICTORIAL VIEWS. Figure 12-3 (shows) examples of several kinds (of) pictorial drawings. Persons familiar (with) the subject often make (perspective-view) sketches. These views show (the) object as it would (actually) appear to the eye. (An) easier view to sketch, (although) the result is not (so) pleasing in appearance as (a) well-made perspective, is one (of) the pictorial methods of (projection), such as isometric or (oblique). These methods all show (three) faces in one view. (Their) advantage is that the (principal) lines can be measured (directly). Although similar in effect, (these) three methods should not (be) confused.

Cabinet drawing is (a) form of oblique drawing (in) which distances on the (receding) axes are reduced one-half. In other words, it is drawn only half as deep as a normal oblique view.

GROUP READING INVENTORY

INDUSTRIAL ARTS EDUCATION

The questions in this diagnostic survey test are designed to measure the following reading skills in the proportions shown below.

A. Using parts of the book (questions 1-5).

B. Using resource materials (questions 6-9).

C. Using maps, pictures, charts, etc. (questions 10-13).

D. Vocabulary (questions 14-16).

E. Noting the main idea (questions 17-19).

F. Noting pertinent supporting details (questions 20-22).

G. Drawing conclusions (questions 23-25).

H. Noting the organization of the material (question 26).

Questions contained in D through H above are based on a reading selection of not more than 3-4 pages.

ADMINISTRATION

1. Explain the purpose of the test and the reading skills the test is designed to measure to the students. Let the students know the skill being measured, as the test is given.
2. Read each question twice.
3. Write the page reference on the chalkboard as the question is read if the student is to refer to the textbook.

A student is considered to be deficient in any of the skills if he gets more than one question in any of the skills wrong.

GROUP READING INVENTORY

SUBJECT: Mechanical Drawing

TEXT: Drafting For Industry, Brown, W.

READABILITY: 9.5

INTENDED STUDENTS: Grades 9-12.

1. On what page would you find the metric-inch equivalents?

2. On what page does chapter 7 begin? What is the title of the unit of which it is a part?

3. How can the introduction on page 228 help you in your study?

4. Of what value are the aids, problems, and activities shown on page 63 to you for understanding the material in the textbook?

5. In what part of the book would you look to find the page references of this topic: Dual Dimensioning?

6. What library aid will tell you the library number of the book, Drafting For Industry, so that you would be able to find it on the shelves?

7. What is a bibliography?

8. Name one set of encyclopedias. How are the topics in them arranged?

9. Name a library guide that will help you find a specific magazine article. If you were to give a report in class and you knew that most of your information would be in current magazines, what guide would you use that would tell you what magazine(s) and what issue of it to use for information on your topic?

10. What does the maps on page 510 show you?

11. What do the numbers shown on the map on page 510 represent?

12. Turn to page 525, Figure 27-8. What are the dates of the scheduled progress of the surfacing supposed to take place on the bar graph?

13. Turn to page 242. How many steps are there in finding the true size and shape of this object? How many views of the object are shown in the last step? What type of plane is shown in the example?

READING ASSIGNMENT: Page 54-57, TOPIC: Chapter 3, Technical Sketching.

14. Define inclined lines.

15. What does the author mean by a "think through" solution to a drafting problem?

16. What is an instrument line?

17. What are two main purposes of a sketch?

18. When sketching a straight line, your eyes should be located where?

19. What kind of paper is best to learn to sketch on?

20. What should your pencil be doing as you are drawing a line?

21. Why do freehand sketches have "character" all their own?

22. What type of movements with your arm are best for sketching vertical lines?

23. Why is a sketch important before starting the instrument drawing?

24. Why should your arm and hand have free and easy movement when sketching?

25. Will left handed people have difficulty sketching than a right handed person? Why?

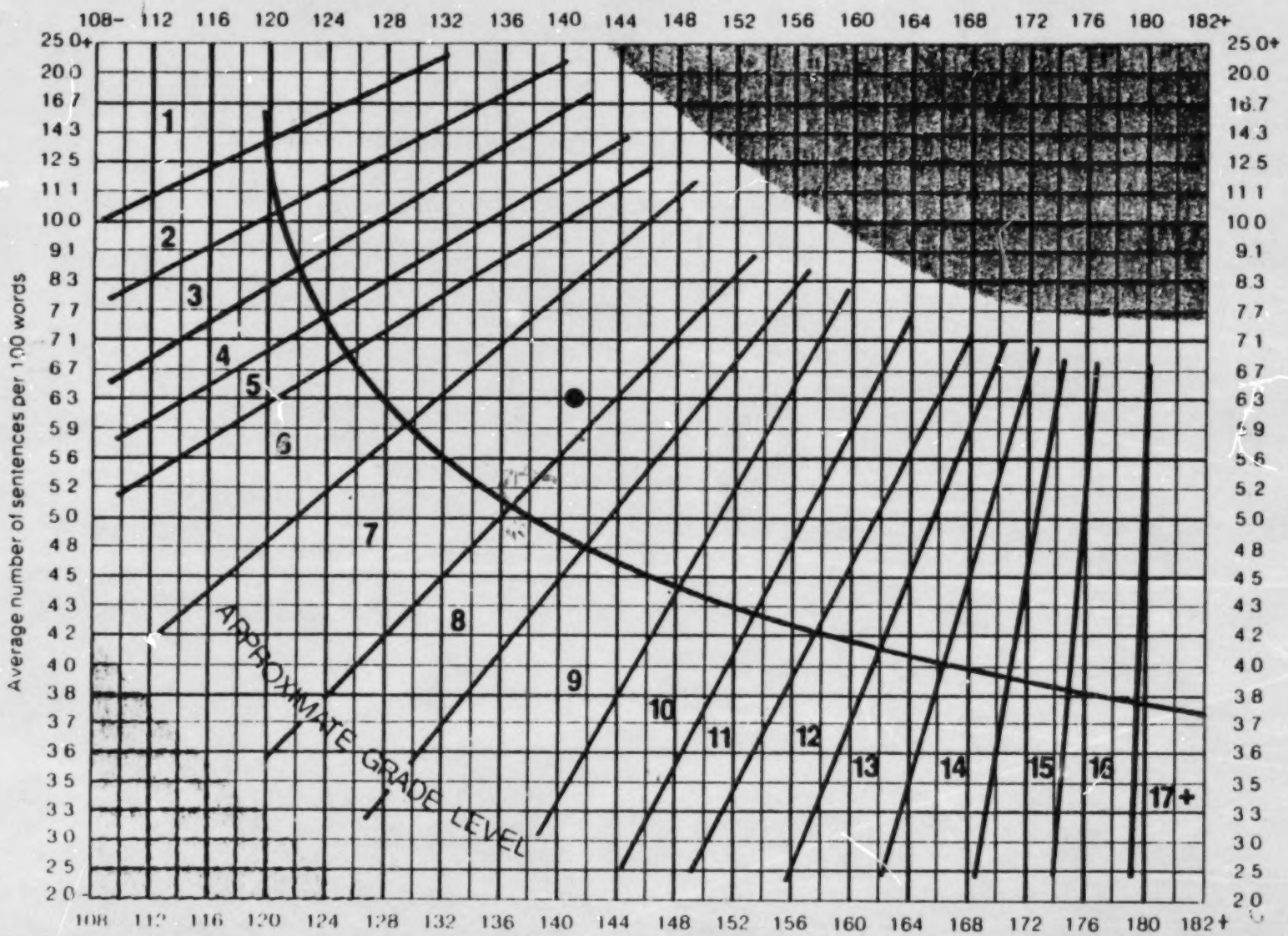
26. Each author follows an outline in writing the information in your textbook. If you were asked to outline the main topics you have just read, what would be the first four?

Selecting Appropriate Instructional Materials

Figur[illegible] 2

GRAPH FOR ESTIMATING READABILITY — EXTENDED

by Edward Fry, Rutgers University Reading Center, New Brunswick, N.J. 08904



5-2

Expanded Directions for Working Readability Graph

1. Randomly select three (3) sample passages and count out exactly 100 words each, beginning with the beginning of a sentence. Do count proper nouns, initializations, and numerals.
2. Count the number of sentences in the hundred words, estimating length of the fraction of the last sentence to the nearest one-tenth.
3. Count the total number of syllables in the 100-word passage. If you don't have a hand counter available, an easy way is to simply put a mark above every syllable over one in each word, then when you get to the end of the passage, count the number of marks and add 100. Small calculators can also be used as counters by pushing numeral 1, then push the + sign for each word or syllable when counting.
4. Enter graph with *average* sentence length and *average* number of syllables; plot dot where the two lines intersect. Area where dot is plotted will give you the approximate grade level.
5. If a great deal of variability is found in syllable count or sentence count, putting more samples into the average is desirable.
6. A word is defined as a group of symbols with a space on either side; thus, *Joe, IRA, 1945,* and & are each one word.
7. A syllable is defined as a phonetic syllable. Generally, there are as many syllables as vowel sounds. For example, *stopped* is one syllable and *wanted* is two syllables. When counting syllables for numerals and initializations, count one syllable for each symbol. For example, *1945* is four syllables, *IRA* is three syllables, and & is one syllable.

Note: This "extended graph" does not outmode or render the earlier (1968) version inoperative or inaccurate; it is an extension. (REPRODUCTION PERMITTED—NO COPYRIGHT)

FRY: ... *Readability Graph*

TEXTBOOK EVALUATION FORM

Title: Modern Welding (1) Cast Metal Technology(2) Author(s): Silvia Bowditch Althouse-Turnquist

Publisher: Goodhart-Wilcox(1), Addison, Wesley(2) Copyright date: 1976(1), 1972(2)

Subject area: Technology (1,2) Grade: Adult (1,2)

Readability level: 9.8(1), 9.1(2) Formula Used: Fry (1,2)

Textbook Aids And Reading Helps

Please check appropriate column:	Excellent	Good	Fair	Poor	Not Included
1. Prefac, Introduction		(1,2)			
2. Table of Contents		(2)	(1)		
3. Glossary		(1,2)			
4. Subject Index					(1,2)
5. Unit Prologues					(1,2)
6. Chapter Prologues				(1)	(2)
7. Chapter Summaries					(1,2)
8. Chapter/Unit Study Questions		(1)			(2)
9. Unit Epilogues					(1,2)
10. Marginal Notes: a. Footnotes					(1,2)
b. Pronunciations					(1,2)
c. Illustriative Materials	(1)		(2)		
d. Abbreviations		(1)	(2)		
11. List of Supplemental Suggested Readings/References					(1,2)
12. Illustrative Materials: a. Photographs, Drawings	(1)		(2)		
b. Charts, Graphs, Diagrams	(1)		(2)		
c. Maps					(1,2)

	Excellent	Good	Fair	Poor	Not Included
d. Timelines					(1,2)
e. Tables			(1,2)		
f. Instructions Given on How to Read or Interpret a Through e above			(1,2)		
13. Use of Colors for Emphasis				(1)	(2)
14. Use of Bolface Print for Emphasis		(1,2)			
15. Use fo Italics for Emphasis		(2)			(1)
16. Short Line, Column-Length format					(1,2)
17. Other: (Please specify) a.					
b.					
c.					

18. How are new or important terms introduced?

a. (1) List
b. (2) Bold Type
c. (2) Italics
d. _____ Colored Ink
e. _____ Marginal Notes
f. (2) Through Content Only
g. _____ Through Content with Definitions
h. _____ Other _____

Date _____ Evaluator _____

Criteria for selecting informational books

I. Handling of subject
   - A. Interest and clarity of discussion
   - B. Truth
     1. Are there errors in facts?
     2. Is discussion objective or subjective?
     3. Omission of essentials?
   - C. Organization
     1. Is discussion well organized?
     2. Balance of presentation
   - D. Difficulty level
     1. Is discussion too difficult for format?
     2. Level of difficulty for students
     3. Readability level

II. Format (quality of the following)
   - A. Illustrations
   - B. Maps
   - C. Diagrams
   - D. Photographs

III. Index (Is it complete and well-done?)
   - A. Author credibility (Is the author qualified to write about the subject?)
   - B. Locational information
   - C. Table of contents

IV. Practical
   - A. Attractiveness
   - B. Price
   - C. Binding

V. Quality of writing

VI. Student's reaction

Reading Teacher, Vol. 31, No. 6, March, 1978, pp. 706-7.

Techniques to improve vocabulary

HOW TO CRACK DOWN ON A WORD

IN INDUSTRIAL ARTS

1. CONTEXT Always search for clues in the context first.

2. STRUCTURE AND SOUND Look for familiar parts in the word.

3. DICTIONARY If the first two steps do not work, go to the dictionary.

Using the dictionary can verify or reject any guesses you may have made using the first two steps. It improves your memory ability, by knowing you were right, or catching yourself at being "way off base".

4. RECORD THE WORD For future reference.

Example:

Directions

Read the following sentences and write the words that best help you define the scrambled word. Then try to unscramble it.

1. Basic knowledge of drafting fundamentals and procedures are required to be a draftsman gneaitr. Types of clues:_____
_____ Word:_____

2. The ldiast draftsman prepares working drawings, works on assembly drawings, wiring or circuit diagrams, and charts and graphs. Types of clues:
_____ Word:_____

3. Knowledge of the field and products being drawn when the tyoula draftsman uses sketches and models to do scaled layout models of product designs.
Types of clues:_____ Word:_____

4. The highest level draftsman is the gsecni draftsman, who does layout work and prepares complex detail and assembly drawings. Type of clues:
_____ Word:_____

5. The lacnihcte liuslrotra draws mechanical objects in pictorial form; using line work, shading or colors to give it a more realistic appearance.
Types of clues:_____
Word:_____

B. Parrish
ASU/1977

STRUCTURED OVERVIEW: A method of presenting vocabulary terms in a reference to the reading material or understandings of an unit.

HOW??????

STEP 1. Complete steps 1 and 2 of the Task Analysis procedure.

STEP 2. Arrange the vocabulary into a schema that shows the interrelationships among the concepts.

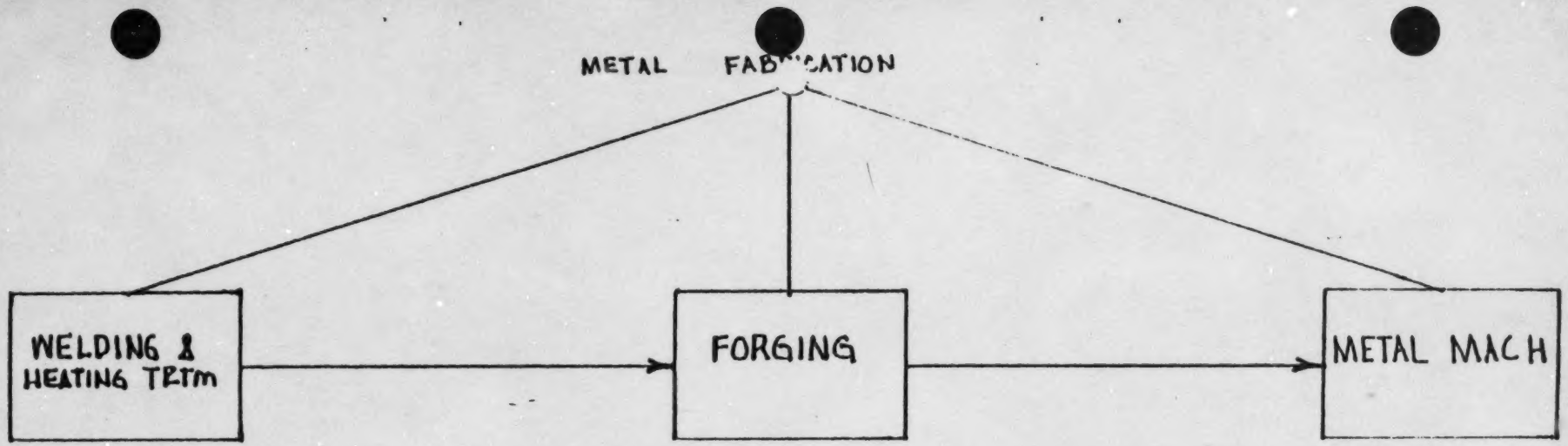
STEP 3. Add to the schema vocabulary concepts which will more clearly depict these interrelationships.

STEP 4. Evaluate the overview. Is it clear? Can it be simplified without loss of meaning?

STEP 5. When introducing the overview, display the schema and briefly explain why it is arranged as it is (or let the kids try it). Encourage student input.

STEP 6. Continue use of the overview for the duration of the unit, relating new concepts and vocabulary as the need arises.

BE AS CREATIVE AND VERSATILE AS POSSIBLE when developing the schema. Throughout the semester use different designs, flow diagrams, pictures, outlines, and materials (transparencies, mobiles, bulletin boards, charts, posters, labels, etc.) and all sorts of attention-getting techniques.



ACETLYENE
a) gas
b) FLAME
c) TORCH
ANNEALING
a) SOFTEN
b) HEATING
METALLERGY
a) PROPERTIES
b) CHEMICAL
c) physical
WELD
a) FUSING
b) HEATING
TEMPER
a) HEAT
b) HARDNESS
JIG

ALLOY
a) MIXTURES
b) COMBINING
CRUCIBLE
a) CONTAINER
DIE
DRAFT
a) TAPER
FORGING

SPINNING
a) SHAPING
TAPER
a) diameter
b) decrease
TAP
a) THREADS
b) CUTTING
DIE
ALLOY

STRUCTURED OVERVIEW

Bill McKeon
RDG 467/480

INDUSTRIAL ARTS VOCABULARY

There are many words in our language that have multiple meanings. It is the responsibility of the Industrial Arts teacher to teach the meaning of these words, as they will be used in his content area. Vocabulary can be dull or exciting. Make vocabulary development an activity that permeates the entire program of study.

When introducing the new content area vocabulary there are many things you can do to make your lesson more enjoyable and more meaningful to your students. Use first hand experiences, pictures, objects, dramatizations and audio-visual aids. Discuss concepts and try to relate them to your students' past experiences.

Following is a list of many words which have multiple meanings. You should include words such as these in your vocabulary lessons. Your students must know what these words mean in your content area.

Def. Accelerator: used to increase the speed of action or of motion.

I.A. Accelerator: linkage; carburetor circuit; or foot operated pedal to regulate engine speed.

Def. Baffle: to frustrate by puzzling or confusing.

I.A. Baffle: an obstruction for deflecting the flow of exhaust gases or sounds.

Def. Bore: a tiresome, dull person or thing.

I.A. Bore: diameter of a hole, such as a cylinder.

Bore: process of enlarging a hole by machining.

Def. Boss: an employer or supervisor.

I.A. Boss: strengthened section within an engine or within pistons.

Def. Bounce: to spring back, as upon impact.

I.A. Bounce: (Engine Valves) a condition where valve is not held tightly in seat of head.

Bounce: (Ignition) a condition where breaker points make and break contact when they should remain closed.

Def. Brushes: devices for cleaning, painting, etc.

I.A. Brushes: bars of carbon which contact commutator of an electric motor or generator.

Def. Cell: a small room. as in prison; or a small unit or protoplasm which makes up all plants and animals.

I,A. Cell: unit of a battery containing a group of positive and negative plates.

Def. Charge: to make liable for; to ask as a price.

I.A. Charge: passing an electrical current through a battery to restore it to activity.

Def. Circuit: a going through a regular journey, such as a district judge.

I.A. Circuit: path of electric current, fluids or gases.

Def. Conductor: one who conducts; one who has charge of passengers on a train.

I.A. Conductor: a material through which electricity will flow with slight resistance.

Def. Detergent: a cleansing substance.

I.A. Detergent: a compound in engine oil to remove engine deposits an hold them in suspension in oil.

Def. Discharge: to release or dismiss ; to unload; to shoot; to emit.

I.A. Discharge: reduction of battery power due to loss of current.

Def. Eccentric: odd in conduct; peculiar.

I.A. Eccentric: a disk set off center on a shaft for converting circular motion into reciprocating motion.

Def. Field: a stretch of land; wide unbroken place such as a football field.

I.A. Field: an space within which magnetic or electrical lines of force are active.

Def. Fit: any sudden uncontrollable attack such as a convulsion.

I.A. Fit: satisfactory contact between two machines surfaces.

Def. Float: anything that stays on the surface of a liquid; a low flat vehicle used in parades.

I.A. Float: a hollow part which is lighter than fuel, used to operate a valve controlling entrance of fuel or fluid.

Def. Gum: sticky substance given off by trees and plants; an adhesive; glue.

I.A. Gum: in automotive fuels; oxidized petroleum products which accumulate in fuel system, carburetor and engine.

Def. Key: a device for opening a lock; a thing that solves a problem, a code.

I.A. Key: a small block inserted between a shaft and hub to prevent circumferential movement.

Def. Knock: to strike a blow, to bump; collide.

I.A. Knock: used to describe noises made by loose or worn mechanical parts, pre-ignition or detonation.

Def. Port; a harbor; a sweet, dark wine; left side of a ship as one faces forward.

I.A. Port: openings in cylinder head for valves exhaust and inlet pipes or water connections.

WOOD TECHNOLOGY VOCABULARY GAME

	WOODS	HAND TOOLS	USES OR PRODUCTS	POWER TOOLS	TERM OR OPERATION
F					
C					
D					
S					
R					
P					
L					
M					
B					
S					

Wood technology vocabulary game

Woods 1-2

9th

Average to above average

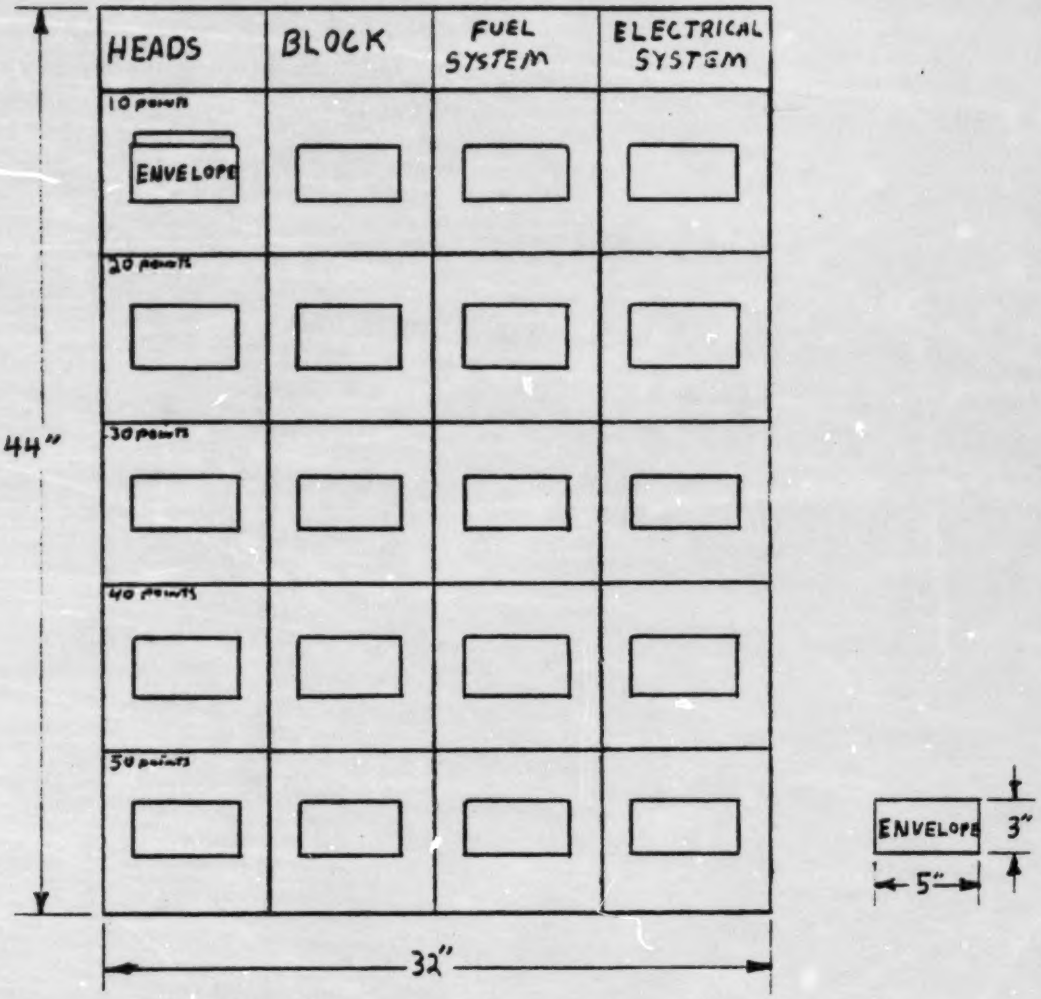
Students should be able to recognize important woods tools uses and products for this class

Each student after proper instruction should be able to complete this game with 100% accuracy.

GROUP VOCABULARY ACTIVITY

ENGINE OVERHAUL

Gary Rogers
Reading
467/480
Assn. Unit 6



This is a group activity game that is similar to the TV game jeopardy and it is used to help motivate the students to enlarge their vocabulary skills of the technical language (or jargon) that is used by automotive mechanics.

The game is constructed by the instructor and it can be made any size, but I used 44"X32" so Icould use 3X5 envelopes to hold the questions in each point level of each category. The students are divided into groups (2 or 4) and they compete against the other groups to see who can answer the most questions accurately and thus have the most total points at the end of the game. The questions are taken out of five categories and are so arranged that the most difficult questions receive the highest point value.

QUESTIONS FOR CATEGORIES

HEAD CATEGORY: Question for 10 points: What is the name of the sheetmetal cover that is bolted onto the head? Valve cover.

Question for 20 points: What is the most common way the valve stem to rocker arm clearance is maintained in a conventional V8 engine? Through hydraulic lifters.

Question for 30 points: Which is the largest valve in the head of conventional V8 engine , the intake or the exhaust? Intake.

Question for 40 points: What is the name of the part that is made for the valve stem to ride in? Valve guide.

Question for 50 points: What is the area called that is made up between the head and the top of the piston? Combustion chamber.

BLOCK CATEGORY: Question for 10 points: What type of metal are most amwrican made blocks made of ? Cast iron.

What is the name of the part that connects the piston to the rod? Rist pin. (20 points)

What do the connecting rods bolt onto ? Crankshaft. (30 points)

What is the ratio between the crankshaft and the camshaft? 2 to 1

How is the stroke of an engine determined? BY the crankshaft throw. (50 points)

FUEL SYSTEM: What is the name of the engine part that mixes the air and fuel together? The carburetor. (10 points)

What is the part that delivers fuel from the gas tank to the carburetor? The fuel pump. (20 points)

What is the part that delivers the air-fuel mixture to the heads? The intake manifold. (30 points)

What is the part of the carburetor that stores fuel for mixture? The float bowl chamber. (40 points)

How is fuel regulated into the float bowl chamber? Needle and seat valve. (50 points)

ELECTRICAL SYSTEM: What is the name of the part that distributes the spark at the right time and right cylinder? THE distributor (10 points)

What part of the system makes the high voltage possible? The coil (20)

What part is used to "make" and "brake" the coils magnetic field so it can create this high voltage? Breaker points. (30 points)

What does dwell mean? Time in degrees, that the points are closed.(40)

If the rubbing block of the points wears down, will you have a advanced or reatarded timing as a result? Retarded (50 points)

Techniques to improve comprehension

B. Parrish
ASU/1977

TASK ANALYSIS

TASK ANALYSIS: A self-preparation exercise for teachers to be done BEFORE a reading assignment is given. It helps the teacher plan activities to facilitate the understanding of the major concepts, words, and processes needed for the assignment.

HOW????????

STEP 1. Identify the major concepts of the chapter or assignment. These concepts are those ideas that you want your brightest students to know.

STEP 2: Identify the key vocabulary words. These are the specialized and technical vocabulary words that carry the meaning of the major concepts or the words that are necessary to the understanding of the activity.

STEP 3: Identify the processes and/or skills that need to be applied in the assignment. These could be listening, observing, following directions, following a sequence, interpreting charts, pictorial matters, and any of the various comprehension skills and study skills.

STEP 4: Set priorities of the major concepts. Label them thus:

MI (Most Important) - Those concepts which all students should be able to understand and learn

I (Important) - Those concepts which most of the students should be able to understand and learn

LI (Least Important - Those concepts expected of the brightest students to understand and learn

TASK ANALYSIS

FOR

INDUSTRIAL ARTS

1. How is iron and steel made? (I)
2. Name some processes for forming metal. (I)
3. Understand hand tools: (MI)
   a. for forming
   b. for measuring
4. List and describe some sheet metal joining process. (I)
5. Define heat treating and list its components. (LI)
6. List and describe foundry processes and products. (I)
7. List different ways to machine metal. (MI)
8. Define oxy-acetylene welding. (MI)
   Define sheet metal arc welding.

VOCABULARY WORDS

T-technical, S-specialized, G-general

1. acetylene T
2. alloy T
3. anneal S
4. crucible S
5. die S
6. draft S
7. forging T
8. jig S
9. metallurgy T
10. spinning S
11. taper S
12. tap S
13. weld T
14. temper S

Processes and/or skills needed to apply to this course:

1. Demonstration
2. Observation
3. Listening skills
4. Student activity
5. Group work
6. Completion of shop material
7. Discussion
8. Evaluation of articles
9. Problem solving

TASK ANALYSIS:

I. Major Concepts in your content area for brightest student.
   a. Use in Industry
   b. Jobs associated with foundry.
   c. Knowledge of related processes.
   d. Quality needs associated with castings.

II. KEY VOCABULARY
   a. Cope
   b. Drag
   c. Riddle
   d. Gate
   e. Runner
   f. Draft

III. PROCESSES/Skills
   a. Determine Sequence
   b. Retain facts
   c. Predicting outcomes
   d. Visualizing
   e. Spot inconsistencies
   f. Problem solving
   g. Synthesize ideas with others.

IV. SET PRIORITIES for MAJOR CONCEPTS
   a. LI- refer to Step I.
   b. I- All basic manipulative skills and nominclature.
   c. MI- Manipulative skills.

Scott Lathrop

SAMPLE DIRECTED LISTENING LESSON

DVL Objective:

1. The student will become familiar with parts of the Circular Saw.
2. The student will know the difference between corsscut and rip sawing.
3. The student will learn the safety rule for the Circular Saw.
4. The student will learn the operating adjustments of the Circular Saw.

Materials:

Circular Saw and accessories, listening process study guide, vocabulary structured overview, written questions to check comprehension, and follow-up problem.

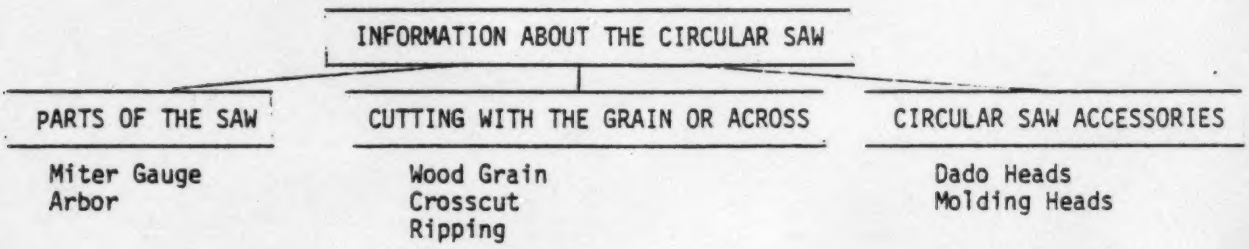
Procedure:

1. First motivate students; I would show projects, wood joints, special molding, and cuts that were done on the Circular Saw.
2. Purpose of demonstration: Explain that the reason for this demonstration is to show how the Circular Saw is used to make these projects, modling, etc.
3. Introduce new vocabulary: Before demonstration split class into groups. Write on board new vocabulary words, heading and sub-headings of demonstration. Ask the groups to put into structured overview. (see structured overview.)
4. Process listening guide: Hand-our listening guide. Explain how the listening guide works. Make sure student knows it should be done individually, and during the demonstration. (see process listening guide)
5. Proceed with demonstration.
6. Evaluation of demonstration: After demonstration, through oral feedback, ask question pertaining to information covered in demonstration.
7. Develop comprehension: Written homework, questions covering all four levels of comprehension. (see comprehension questions)
8. Follow-up: Require practice project. (see follow-up problem)

****

VOCABULARY - STRUCTURED OVERVIEW

New Vocabulary: Miter gauge, Arbor, Crosscut, Ripping, Wood Grain, Molding Heads, Dado Heads



LISTENING PROCESS STUDY GUIDE - FOR CIRCULAR SAW

DIRECTIONS: During the demonstration fill-in the blanks.

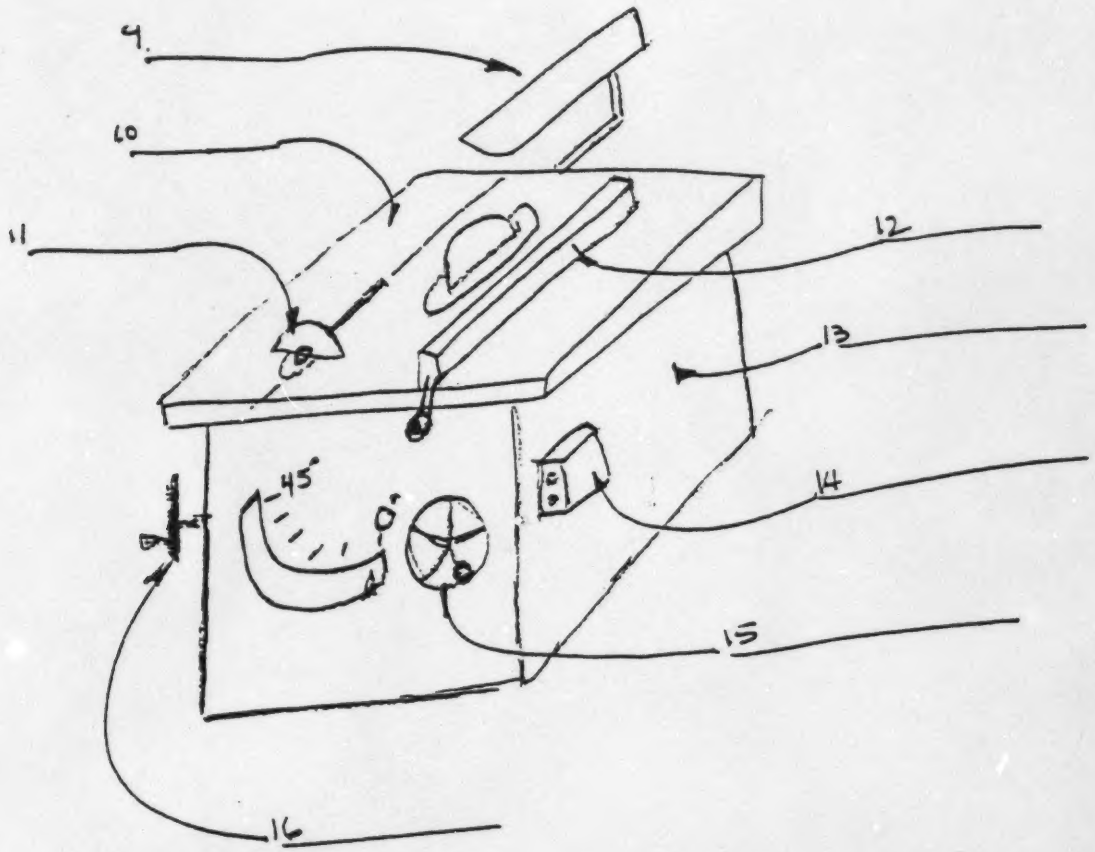
SAFETY FOR THE CIRCULAR SAW

Example: Clothing: Do not wear loose clothing.

1. Stance: _____
2. Safety Guard _____
3. Push stick _____
4. Freehand Sawing _____
5. Safety Guard _____

Example: Make no adjustments, while the blade is in motion.

6. Request _____ from the instructor before you start to operate the saw.
7. Remove the _____ _____ when you crosscut.
8. Don't leave until the blade _____ completely.



COMPREHENSION QUESTIONS

HOMEWORK:

1. List five parts of the Circular Saw.
2. What part of the Circular Saw should be used when ripping?
3. Explain why you should not use the miter gauge and fence at the same time?
4. Explain why you would not use the fence when ripping?
5. In your opinion what would be the most important safety rule?
6. If you were making a table would you use the Circular Saw? For what cuts?

* * * * * * * * * * *

FOLLOW-UP PROBLEM

To be Done In Wood Lab:

Take a piece of wood, cut it on the Circular Saw so that it measures 4" X 8", next cut a Dado, then put a molding head on the Circular Saw, and on edge of wood. When you complete this task turn practice block in for grade. (25 points)

Three - Level Study Guide

General Shop: "Selecting and Roughing Out Stock"

*1. What are the two classifications of trees?

**2. Compare hardwood with softwood and list some differences.

*3. What determines the grade of lumber?

*4. Softwood lumber is divided into two classifications. What are these classifications?

****5. What grade of lumber would you select for your next project. Analyze and state the reasons for your choice.

**6. Briefly summarize the method for figuring board footage.

*7. The outside layers of plywood are called face. What are the inside layers called?

*8. What are three types of softwood?

*9. What are three types of hardwood?

**10. How could the use of the lowest grade No. 1 common lumber effect the outcome of a project.

***11. How could a miscalculation in board feet effect project completion?

*12. What is the instrument used to make a rough layout on the stock?

*13. What is another term often used for softwood trees?

*14. What is the second best grade of hardwood called?

****15. Relate a personal experience in the selection of laving out of lumber.

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* Literal level of comprehension
** Interpretive level of comprehension
*** Critical level of comprehension
**** Creative level of comprehension

STUDY GUIDE

Roof Designs

SOURCE: ARCHITECTURAL DRAWING

GRADE LEVEL: 10th & 12th

ABILITY LEVEL: AVERAGE TO HIGH

SKILL TAUGHT: COMPARE - CONTRAST

The appearance of a home is greatly affected by the roof lines, and materials used for construction. The designer should pick a roof that will compliment the basic design and be correct for the type of environment the house will be located in.

Pick the correct roof(s) that will fit the specifications listed below. There may be more than one answer, but be prepared to back your answers up.

1. Provides for ventilation.

   ___GABLE ___HIP ___FLAT ___SHED ___MANSARD ____GAMBRIL ___BUTTERFLY

   ____A-FRAME ___FOLDED PLATE ____CURVED PANEL

2. Easily built.

   ____GABLE ___HIP ___FLAT ___SHED MANSARD ____GAMBRIL ___BUTTERFLY

   ____A-FRAME ____FOLDED PLATE ____CURVED PANEL

3. Sheds Water well (drainage).

   ____GABLE ____HIP ____FLAT ____SHED ____MANSARD ____GAMBRIL

   ____BUTTERFLY ____A-FRAME ____FOLDED PLATE ____CURVED PANEL

4. Applicable to a variety of house shapes and designs.

   ____GABLE ____HIP ____FLAT ____SHED ____MANSARD ____GAMBRIL

   ____BUTTERFLY ____A-FRAME ____FOLDED PLATE ____CURVED PANEL

5. Economical

   ____GABLE ____HIP ____FLAT ____SHED ____MANSARD ____GAMBRIL

   ____BUTTERFLY ____A-FRAME ____FOLDED PLATE ____CURVED PANEL

6. Popular in warm areas.

   ____GABLE ____HIP ____FLAT ____SHED ____MANSARD ____GAMBRIL

   ____BUTTERFLY ____A-FRAME ____FOLDED PLATE ____CURVED PANEL

STEPS IN THE SQ3R METHOD

1. Survey the material for cues to content and organization.
   a) Major headings for each section
   b) Topic sentence, including statements in italics or boldface type
   c) Subpoints in an outline(any "listing" device)
   d) Pictures, charts, diagrams, maps (illustrative material

2. Questions bases on the survey guide the reader's thinking.
   a) Ask questions based on the headings of each section.
   b) Use any study guides provided by the author or teacher.

3. Read to answer your question.

4. Recite to check comprehension andto utilize information.
   a) Write brief summary statements to questions in step2
   b) Discuss ideas orally in class.
   c) Organize major points and key phrases in outline form.
   d) Utilize study techniques which have proven effective for you—— such as underlining key sentences, taking brief notes, restating ideas in different words, etc.

5. Review for immediate and delayed recall.
   a) Reread notes to recall major points.
   b) Utilize quizzes to check memory for details
   c) Test your answers to questions in step2
   d) Utilize skimming and scanning techniques to refresh memory and distrigute learning.

LISTENING GUIDE

PREPARING A SAND CASTING

I. Temper Sand
   a.
   b.
   c.
   d.

II. Place the pattern on the moldboard.
   a.
   b.
   c.

III. Set-up the Drag.
   a.
   b.

IV. Dust parting powder.

V. Add and Ram the Sand.
   a.
   b.
   c.
   d.
   e.
   f.
   g.

VI. Vent the Mold.
   a.
   b.
   c.

VII. Add bottom board and turn over the Drag.

a.

b.

c.

d.

e.

f.

g.

h.

VIII. Set the Cope.

a.

b.

IX. Dust parting powder.

a.

X. Set Sprue pin.

a.

b.

c.

d.

IX. Ram the Cope.

a.

b.

c.

d.

e.

XII. Remove the Sprue pin.

a.

b.

c.

XIII. Lift the Cope.

a.

b.

XIV. Draw the Pattern.

a.

b.

c.

d.

XV. Cut the Gate.

a.

b.

c.

XVI. Close the Mold.

a.

b.

c.

Carol Cary

Listening Skills: PAQV

Purpose — Give them a purpose. 1. Listen for ideas. 2. Be selfish- try to get something out of the selection for yourself. 3. This is important for it will be on the test! Direct reference.

Active Anticipation — Read, stop, ask what is coming next. Watch TV, turn it off. Ask what is next. Record something around school. Ask them to identify what it is.

Questioning — After lecturing or giving directions ask students immediately questions pertaining to the material. This will reinforce the knowledge.

Verbal and non-verbal cues — Call students attention to the cues that are a sure indication the points being made are most important. After a few weeks of class the students may be able to point out the various verbal and non-verbal cues to the other students. Teach them to look for raising or lowering of voice, hand gestures, or eye contact and posture of the teacher.

"ROAD SIGNS" FOR READING DIRECTIONS IN DRAFTING

1. **Study the title.**

   It "sets you in" to the type of activity ahead for you.

2. **"Pre-read" the entire procedure to get the general drift.**
   Ask yourself, "What, in general, am I to do?" Now you've set your direction. Now each step in the process takes on meaning. It falls into place in relation to the whole.

3. **"Read" the directions a second time—step by step—with great care!**

   Make a complete step after reading each step, if necessary, to be sure you understand just what you are to do.

   "Thought time" is needed in addition to reading time.

   Form a mental picture of yourself performing each step.

   Seeing yourself perform the step rivets your attention on the meaning.

   If you read without this visual image, your reading may be passive—with your thoughts worlds away.

   Look up any technical information you lack.

   Use the appendix or tables of your textbook.

   "Read" the photographs and drawings.

   As you read your textbook, you'll find countless references to illustrations.

   These give you instant "how-to-do-it" insights—save you working time.

   When you are referred to an illustration shift your attention to the illustration. Read the title—then examine the illustration carefully, noting each label and its corresponding part. When lines, angles, and points are mentioned in the printed matter, locate [illegible] illustration the letters and numbers that designate these.

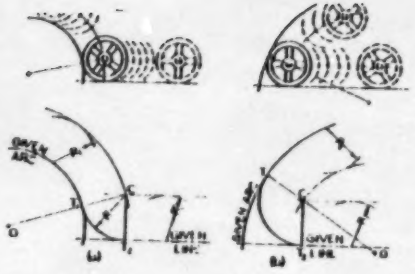
   Illustrations often clarify methods and processes every step of the way, show you what to do and what not to do, and provide helpful examples to follow.

4. **"Zero in"** on amounts, distances, timings, and temperatures. And later make your measurements with precision.

   Quantitative measures flash a warning signal! They're danger spots!

   Reread as often as necessary.

   Note that each step is built on full understanding of preceding steps.



Instructions for (a) and (b):

1. Strike arcs R_1 = radius R (given radius).
2. Draw construction arc parallel to given arc, with center O.
3. Draw construction line parallel to given line.
4. From intersection C, draw CO to get tangent point T_2, and drop perpendicular to given line to get point of tangency T_1.
5. Draw tangent arc R from T_1 to T_2 with center C.

*Reproduced with permission from *Basic Technical Drawing* by Henry C. Spencer, Macmillan Company, New York, 1962.

5. **Unknown terms say "Stop! Look! Learn!"**

   A single word left unknown may make it necessary to redo your entire project.

   You can have "instant access" to full information on many technical terms through the index of your textbook. Turn to a trade dictionary to clear up the others.

   Make sure you know the meaning of abbreviations and symbols.

LEARN TO HANDLE DIRECTIONS EARNESTLY ON YOUR OWN.

"ROAD SIGNS" FOR READING DIRECTIONS IN DRAFTING

6. **Add a last quick "run-through"** to fix in mind the procedure as a whole.

7. **Carry out each step in the order given.**

   The order of steps is critical.

   A single error in any step may throw off the rest of the process.

8. **If something goes wrong:**

   Reread the procedure and recheck your actions.

9. **No question should remain unanswered.**

   If you don't know, don't guess—ask!

PRECISION READING OF DIFFICULT DIRECTIONS IS AN ESSENTIAL TOOL IN TECHNICAL DRAFTING.
Clumsy reading does not pay as you strike out blindly—blunder—then lose time correcting errors and perhaps doing the entire project over. TAKE TIME for precision reading! SAVE TIME when things go right!

from IMPROVING READING IN EVERY CLASS, Thomas, L. and Robinson, H. Allyn and Bacon, Boston, Mass., 1972.

Techniques to stimulate reading

A SHOP LIBRARY CAN TURN ON READERS

from IMPROVING READING IN EVERY CLASS, Thomas E. and Robinson, A. Allynand Bacon, Inc. Boston, Mass., 1972.

Herbert Pearson's technical "library" is often the busiest part of the shop.

You can get a good thing going in a shop or technical classroom "library." Boys who would not be caught reaching for a book in the school library may reach for one here. Here, each time they come to shop, attractive how-to-do-it books and colorful popular magazines can invite boys to *practice* reading.

Picture a turned off reader—yet a boy geared up with mechanical interests—walking into this library. Reading in English class was never like this! On a bookshelf he sees the brightly colored new *Honda Repair and Tune Up Guide*. On display, as in the corner magazine store, are *Popular Mechanics, Mechanix Illustrated, Science and Mechanics, Popular Science*, and others. The shiny cover of one offers him a preview of the cars and drivers slated to appear at the Indianapolis speedway. The equally bright cover of another invites him to build a sailplane from a kit. He turns the pages and finds plans for building himself a combination desk and workbench, or tips for choosing the right caulking for a boat. He leafs through another and finds suggestions for sprucing up his car to make it pay more at trade-in time. He sees a pamphlet, "Careers in Technical Occupations," and looks it over. It invites him to check out his abilities and limitations, size himself up, and perhaps make some plans for *the* job someday.*

With his teacher's guidance, he soon comes to regard the library as a technical know-how center. The doors of the tall cabinet of how-to-do-it books are always open. Books with hundreds of easy-to-grasp diagrams and pictures ease the way to solve his in-class (and sometimes out-of-class) problems. There is no period of waiting, no cooling of enthusiasm or drop in interest while he runs to find a book in the regular school library. His need is right there and right now, and so is the book. He can reach for *Experiences with Electrons, General Shop for Everyone, Modern Metalworking*, the bright-colored *Chilton's Automobile Repair Manual*. The pamphlets supplied by industry are inviting. One of these, the *ABC's of Hand Tools* (General Motors), clarifies the use and care of small hand tools through Walt Disney drawings. He may gain a new view of what is between the covers of a book. Answers he is seeking are right there for him—in *printed words*.

Through this "library," reference skills for reading technical material can be taught *right in shop*, at the time the student is caught up with a problem. In minutes his instructor can teach him to value and use a book's index as an aid to instant finding of what he is looking for from among the many thousands of words in the book. With guidance he can learn to scan pages rapidly to find his target information. These find-it-yourself procedures will be a built-in part of his learning equipment when confronted with "exploding" technological advances after his schooling is over.

Simple check-out procedures encourage him to practice out-of-class reading. He writes his name on the card, then leaves the card with his teacher or a student librarian. The loan period is flexible—in keeping with his current project and the demand for the book by others. Books that everyone needs at once do not circulate—they must be read in the "library."

The books span a broad range of reading difficulty levels. They are processed in the school library, yet considered a permanent part of the classroom collection. Paperbacks on a variety of technical and practical subjects are available at low cost through the Popular Science Book Club, 44 Hillside Avenue, Manhasset, New York 11030.

Benefits of a Shop Library

Staggering sums are required to reclaim students who leave the doors of their schools without reading power and without earning power. The sum expended to finance a shop library is an investment in *prevention*. Here are some of the benefits it may bring to turned off readers:

1. A boy's strong interest in shop-related subjects can help remove psychological blocks to his reading progress.

2. The world of words has never been his world. Now, for the first time, he may spend many hours in the world of printed words. He meets new words repeatedly in similar and different settings, often with a little increment of meaning with each encounter, and gradually incorporates them into his vocabulary. His reading practice tends to strengthen his comprehension.

3. An impelling interest in a subject may enable him to handle "far too difficult" books and to stretch his reading power.

4. As he learns to search out answers for himself in books, he is better able—through reading—to continue his technical education.

5. The inviting do-it-yourself projects in popular magazines and in books often lead to home hobbies.

6. A young person's self-concept can be altered when he experiences success. Success through and with reading in shop class sometimes helps him succeed better in the broader school situation.

* Lists of free or low-cost pamphlets on vocational opportunities in technical fields are available from the United States Printing Office, Washington, D.C. A list will be mailed on request.

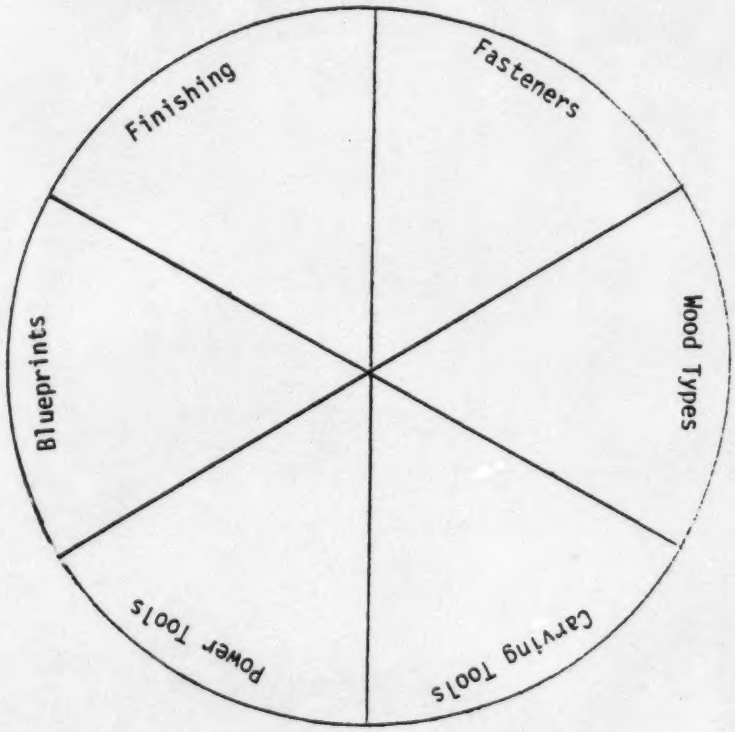
CHOOSING SUBJECT MATTER BOOKS: PERSONAL INTEREST

LEVEL — Middle grades and above.

OBJECTIVE — To use students' choices to expand their personal interest in the course.

DESCRIPTION — Identify five or six major areas of emphasis where students should read to expand their awareness of the subject and to better prepare themselves for the objectives of the class. Encourage students to use their present knowledge and interests in the area to select their readings, and distribute to each a pie design like the one below.

1. Draw a circle and divide it into pie-shaped chunks.
2. In each pie-shaped piece, write a category in which you want the students to read.
3. During the term, the students are to read some article or book that fits the category and also gives them better preparation to succeed in the course. (Brief oral reports on each item listed in the circle could form part of the students' grade.)
4. The circle below is designed for use in a vocational education course, but the idea could be adapted to any subject by changing the titles to those that fit the course. A brief bibliography could accompany this reading design.



DIRECTIONS: Read a book or an article for each section. Write in title and author of book or article that you have read in each category. Be prepared to give your reaction to each one, especially on how you think it can be used.

Jean Read
RDG 544
Summer 1979

Using the Newspaper in Vocational Education

Students enroll in vocational education classes for a variety of reasons. Some are actively preparing for a career in say automotives, construction, or woodworking; others just like to work with their hands and want to learn more about tools; and some just want to take a class that is different from their regular classes like English or history. The newspaper can be used in the vocational education classes to stimulate reading in a variety of ways and can be geared to fit the needs and interests of both students who are seeking a career and for those who just like to "putter" around the house. In addition to practical knowledge, all sorts of reading/thinking skills as well as math and vocabulary skills can come into play as the students learn to use the newspaper.

Activities

1. Using the want ads, budget out a home improvement project. Be sure to include prices on all materials (even down to the sandpaper!) and on all tools including both power and hand tools that will be needed.

   (This activity and the next one can be made into a contest where individuals or groups compete to get the lowest "bid" on the project.)

2. Using the want ads, outfit a complete home shop including all hand and power tools and accessories. (Students could make posters from pictures they cut from the paper. This activity could then be made somewhat ongoing. The teacher could periodically review the posters and cross out one or more of the items indicating that the item was consumed, like sandpaper or nails, or that the item had been lost, stolen, or damaged. In this way the students may be able to get an idea of price trends. If the item were a power tool that quit working, the student has to decide if it should be replaced or repaired. Repair of an item can bring in such things as warranty, guarantee, authorized dealer, consumer protection.

3. Develop a class project for some home-improvement plan like adding on a room or remodeling an existing room. Students would first have to decide what was to be done. Then students could bring in ads for different materials and together they should decide which to use considering such things as quality and availability as well as price.

4. Keep a "Home-Fix-It" or a "Do-it Yourself" file. This could include articles on such things as care and maintenance or household appliances, repair or refinishing of furniture, etc. (Hint: The Sunday paper abounds with articles of this type.)

5. Collect articles on different ways to build furniture. See if your teacher will let you try one of these techniques for a class project. Again, the Sunday paper often has articles on this.

6. Keep a class file of articles dealing with different trade unions. See if you can figure out from the articles what the requirements are for joining a union and what benefits they offer. If not, write to a local union and see what information they can send you.

7. Follow a local or national strike or shut-down (like the truckers). Determine what the effects of the strike may have on consumers and the workers and what long term effects it may have on future employment.

8. Keep a file of the progress on a major construction site in your area (a shopping center, the Palo Verde plant) being sure to note any problems the workers or trade union members may be having.

9. Make a chart or graph showing employment trends in the various trades. Some of this information may come from articles about lay-offs, or you can check out the want ads to see what jobs are available in which areas. You could take one specific trade and compare the number of job openings over a period of time or you can compare one trade to another. Also try to determine what causes any fluctuation in availability of work in any one trade--is the work seasonal? has there been a slow-down? is there a shortage of materials?

10. Check the classified ads and prepare to apply for a job. Develop a resume being sure to include any skills that you have that would pertain to the job. Have other members of your class do this too and you can stage job interviews.

11. Collect articles about any current events topic that deal with vocational education in terms of industry or construction. ex. the right to work law. On something like this, you could schedule a debate in your class.

12. Collect articles on government agencies that regulate industrial practices like OSHA or EPA. Have a panel discussion or a debate on whether or not these agencies are effective or if they are needed.

13. Using the newspaper, investigate industrial accidents. Try to determine causes and whether the accident could have been prevented and how.

14. Collect articles on industrial pollution. Discuss different ways this pollution could be prevented. Be sure to include articles about how industry is trying to clean up some of this and articles about what citizen's groups are doing to both prevent further industrial pollution and to clean up existing

pollution. Try to think of projects your class can do to help out (recycling newspapers, aluminum cans, etc.)

15. Clip articles that deal with public attitudes toward industry or construction. These might include articles on industrial pollution or other dangers that concern people living nearby or articles about people being forced to move because of some proposed construction.

16. Collect articles on alternative forms of energy (solar, geothermal, etc.) Have a class debate with different people or groups defending a certain form of energy.

17. Collect articles on different types of heating and cooling systems. In small groups or as a class, discuss which type of systems are best for your area in different types of structures i.e. apartment buildings, small and large homes, office buildings, schools, stores, shopping centers.

18. Keep a file on new trends in automobile manufacturing and new types of cars that individuals are designing that are supposed to get better gas mileage or that run on a fuel other than gasoline. Compare the cars and present your decision of which car is better, more practical or more feasible. Try to determine what the cost would be to convert a regular engine to one of the newer types.

19. Collect articles on shortages of materials used in construction or industry. Try to trace the effect such shortages will have ultimately on the worker both now and in the future.

Bibliography of books and articles related to reading

INDUSTRIAL ARTS BIBLIOGRAPHY

PURPOSE: This suggested book list covers a wide variety of different books related to industrial arts.

WOODS BOOK LIST:

Bench Woodwork, Feirer, Hutchings, Charles A. Bennett, Inc.

Contemporary Lamps, Holbrook, McKnight & McKnight Co.

Exploring Woodworking, Zimmerman, Goodheart & Willcox.

General Woodworking, Groneman, McGraw-Hill Book Co.

Getting the Most out of Your...

- Band Saw
- Circular Saw
- Drill Press
- Lathe
- Scroll Saw/Jointer

Deltacraft Publishing Co.

Industrial Arts Woodworking, Feirer, Chas. A. Bennett, Inc.

Modern Carpentry, Wagner, Goodheart & Willcox.

Make Your Own Sports Gear, Spielman, Bruce Publishing Co.

Projects in Wood Furniture, Douglas-Roberts, McKnight & McKnight.

Woodworking, Wagner, Goodheart-Willcox.

Basic Woodworking Projects, McGinnus-Ruley, McKnight & McKnight.

Sunset Books, Lane Publishing Co.

- Wood Projects
- Ideas for Storage
- Tables and Chairs
- Woodcarving
- Basic Carpentry
- Bathrooms
- Basic Home Repairs
- Childrens rooms & Play Yards
- Easy to Make Furniture
- Furniture Finishing and Re-finishing
- Book shelves and Cabinets

Woodworking Technology, 1972, Hammond, Donnelly, Harrod, Ryner, McKnight & McKnight.

Cabinetmaking, Feirer, Charles A. Bennett, Inc.

Woodturning, E. Rebhorn 1970, McKnight & McKnight.

Carpentry, Wagner, Goodheart & Willcox.

Art of Woodturning, Klenke, Charles A. Bennett, Inc.

Woodturning Visualized, R. C. Cramlet, Bruce Publishing Co.

Woodworking for Industry, Feirer, Chas. A. Bennett, Inc.

Operations of Modern Woodworking Machines, Hyorth-Hotrop, Bruce Publishing Co.

METALS BOOK LIST:

Exploring Metal Working, Walker, Goodheart-Willcox.

General Metals, Feirer, McGraw-Hill, 1967.

Metal Work, Feirer, Lindbeck, Chas. A. Bennett Co.

Modern Metal Working, J. Walker, Goodheart & Willcox.

Metal Working 2, Boyd, Goodheart & Willcox.

Practical Metal Projects 2, Ruley, McKnight & McKnight.

Projects in General Metal Working 2, Ruley, McKnight & McKnight.

Technical Metals, Johnson, Chas. A. Bennett, Inc. 1973.

Sheet Metal, R. Smith, McKnight & McKnight.

Modern General Shop, Borwn, Wagner, Boyd, Gerrish, Goodheart & Willcox.

Metalwork-Technology & Practice, Ludwig, McCarthey.

Turning Technology, Krar, Oswald, Delmar Publishing Co.

Machine Tool Technology, McCarthy-Smith, McKnight & McKnight.

HOT METAL BOOK LIST:

Forging & Welding, Smith, McKnight & McKnight.

Heat Treatment of Metals, Litton Ed., Delmar Publishing Co.

Modern Welding, Bowditch, Althouse & Tuinquist, Goodheart & Willcox.

Welding Processes, Griffin- Roden, Delmar Publishing Co.

Basic Arc Welding, Griffin- Roden, Delmar Publishing Co.

Basic Oxy-acetylene Welding, Griffin- Roden, Delmar Publishing Co.

Arc Welding, Walker, Goodheart & Willcox.

Welding, Cutting & Heating Guide, Victor Cutting & Welding Division.

PLASTICS BOOK LIST:

Industrial Arts Plastics, 1964, Edwards, Chas. A. Bennett Co.

Industrial Plastics 3, 1971, Baird, Goodheart & Willcox.

Plastics, Cope & Conway, 1966, Goodheart & Willcox.

Plastic Projects and Techniques, Lappin, McKnight & McKnight.

Plastics Technology, Swanson, McKnight & McKnight Co, 1965.

General Plastics, Cherry, McKnight & McKnight Co., 1967.

Modern Plastics, McGraw-Hill Encyclopedia, 1970-71.

Fiber Glass, Projects & Procedures, Steele, McKnight & McKnight.

CRAFT BOOK LIST:

Artistic Metal work, Bick, Bruce Publishing Co.

Basic Crafts, Lindbeck-Hansen, Charles A. Bennett Co., 1969.

Leathercraft (2), Groneman, Charles A. Bennett Co.

General Leathercraft, Cherry, McKnight &McKnight Co.

Ideas for Leather Belts You Can Make, A. Stohlman, Tandy Leather Co.

Leather Work, Stohlman, Patton, Wilson, Tandy Leather Co.

Art Metals, Seigner, Goodheart & Willcox.

Essentials of Modern Upholstery, Bast, Bruce Publishing Co.

Handwrought Jewelry, Franke, McKnight & McKnight.

Art of Making Wooden Toys, Stevenson, Chilton Book Co.

Lost Wax Casting, Kerr, Kerr Manufacturing Co.

Macrame Techniques and Projects, Sunset Books, Lane Pub. Co.

Ceramics, Sunset Books, Lane Publishing Co.

Furniture Upholstering and Repair, Sunset Books, Lane Pub. Co.

POWER MECHANICS BOOK LIST:

All About Small Gas Engines, J. Purvis, Goodheart & Willcox.

Auto Mechanics Fundamental, Stockel, Goodheart & Willcox.

Automotive Encyclopedia, Toboldt, Johnson, Goodheart & Willcox.

Power Mechanics, Atteberry, Goodheart & Willcox.

Small Gas Engines, T. Pipe, Howard W. Sams & Co.

Auto Body Repairing & Repainting, B. Tobodbt, Goodheart & Willcox.

General Theories of Operation, Briggs & Stratton.

Repair Instructions II, Briggs & Stratton.

Small Engines Service Manual, Intertec Publishing Corp. 1969.

GRAPHICS BOOK LIST:

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Silk Screen Printing, Eisenberg & Kafka, McKnight & McKnight.

General Printing, Pitkin-Cornwell, McKnight & McKnight.

Practical Photography, McCoy, 1972, McKnight & McKnight Co.

Graphic Arts, Kagy, Goodheart & Willcox, 1965.

GENERAL INDUSTRIES BOOK LIST:

Modern Carpentry, Wagner, Goodheart & Willcox.

Woodworking for Industry, Feirer, Charles A. Bennett, Inc.

House Wiring Simplified, Mix, Goodheart & Willcox.

Home and Building Maintenance, Woodin, Hayes-McKnight & McKnight.

Walks, Walls & Patio Floors, Sunset Books, Lane Publishing Co.

Bricklaying I, Delmar Publishing Co.

Bricklaying II, Delmar Publishing Co.

Concrete Technology, Delmar Publishing Co.

Ideas for Building Bardecues, Sunset Books, Lane Pub. Co.

ELECTRICITY/ELECTRONICS BOOK LIST:

All About Home Wiring, F. Mix, Goodheart & Willcox.

Home Mechanics, Schaefer, Smith, Bruce Publishing Co.

Electronics 4, Gerrish, Goodheart & Willcox.

How to Repair Small Appliances, J. Darr, Howard W. Sams, Inc.

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Exploring Electronics, Gerrish, Goodheart & Willcox.

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The World of Drafting, Ross, McKnight & McKnight Co., 1971.

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General Architectural Drawing, Wyatt, Chas. A. Bennett, Inc.

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Work Bench, Garden Way Research, Charlotte, Vermont 05445.

Popular Mechanics, Des Moines, Iowa 50350.

Woodcraft, Woodcraft Supply Corp., Woburn, Mass., 01801.

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DCA Educational Products, Inc., 4865 Stenton Avenue, Phil., Pa.

Stanley Tools, New Britain, 600 Myrtle St., New Britain, Conn.

Bergwall Productions, Inc., 839 Stewart Avenue, Garden City, N.Y.

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